



# Teachers finding games give a leg up on learning

Conference looks to integrate games, lessons

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Heidi McDonald saw her fourth-grade son, Ian, growing bored while memorizing his multiplication tables and figured he would make better progress if she could make the exercise fun.

As an educational video and computer game designer for South Side-based Schell Games, Ms. McDonald is used to building educational concepts into games.

For Ian, instead of creating a new game, she used his favorite computer game, Minecraft, as the learning vehicle. Together, through the game, they built structures with brick walls, with Ms. McDonald instructing Ian as to the number of bricks to use for the sides of the walls.

"I'd say build a wall four blocks long and six blocks high. How many blocks do we need to fill it in. He didn't even know he was doing multiplication. He was totally tricked," Ms. McDonald said. "I like to say when educational games are done right it's like getting kids to eat chocolate-covered broccoli."

The idea of using gaming to teach students basic skills in math, language arts and other subjects has become popular in recent years, and a number of companies are springing up to create games designed specifically to teach skills of the Common Core, a set of math and English standards adopted by 44 states and the District of Columbia.

"Over 50 percent of households with children hold a tablet. So kids are growing up with an expectation for high interactivity. It's really a shock at school when they don't get that," said Derek Lomas, a Carnegie Mellon University doctoral student in the Human Computer Interaction Institute and a founder of PowerPlay Labs, a 2-year-old firm that produces educational games.

Within the past year the Bill & Melinda Gates Foundation and the John D. and Catherine T. MacArthur Foundation donated \$10.3 million for the creation of the Games Learning and Assessment Lab in Redwood City, Calif., to research and develop video games that teach kids core skills and measure their progress.

Ms. McDonald has her own measure of progress: Her son's math grade rose from 88 percent in the final quarter of fourth grade at Propel Braddock Hills Elementary to a 92 in the first quarter of fifth grade after a summer of playing Minecraft math exercises created by her.

"I think if I have a choice as a parent between spending my time sitting there for an hour showing him flash card after flash card or playing Minecraft, I'd choose playing Minecraft," Ms. McDonald said.

Ms. McDonald and Mr. Lomas were speakers at an educational gaming conference last week at Propel Braddock Hills High School. Propel teachers are expanding their use of gaming in the classroom as they look for ways to increase student engagement and achievement.

In addition, other schools around the county, including Elizabeth Forward, Shaler Area and Bethel Park, have been involved in pilot tests of Mr. Lomas' games. "We've gotten really great feedback from that," Mr. Lomas said.

Mr. Lomas said his gaming company was built on the premise that students can learn effectively through games.

Among the 60 game engines produced, one called Fraction Planet, which is aligned with 50 Common Core math standards.

He said its development was prompted by a study he read that estimated half of eighth graders couldn't put three simple fractions in the right order.

"That shows if you are in eighth grade and can't do fourth-grade math, how are you going to do well in high school and ever get a job? This is a big problem," Mr. Lomas said.

Providing a fraction game for students to play allows them to be involved in repetitive drills but have fun at the same time.

"If we can get kids to do 80 fraction estimates in 15 minutes, we can generate learning outcomes," Mr. Lomas said.

There also are games to teach language arts. Ms. McDonald said Schell Games is working on "The World of Lexica," which will create an immersive 3-D world in which players can interact with famous characters from literature and go on adventures with them.

The game will not only introduce literary characters but also will help to teach spelling and syntax.

Anna Marie Joyce, a K-8 music teacher at Propel, said she uses music technology games to teach the values of quarter, half and whole notes, rhythms and how to memorize the lines of the staffs and keys on the keyboard.

In one game, a super hero lifts a grand piano higher each time a student hits the correct key on the staff. "So you can only get him to fly if you are hitting the right keys," Ms. Joyce said.

Experts say part of the appeal of learning through gaming is that students don't see failing at the game as the same type of failure as getting an answer wrong in class or on a worksheet.

Ms. Joyce has witnessed this.

"They are not embarrassed. They are just more determined to get to the next level," she said.

She finds students remember material better when they learn it through a game rather than her repeated drilling.

Educators say that teaching students to create video and computer games about academic subjects also helps them to learn.

Creating a game requires students to break down and analyze the academic concepts they want to teach in the game. They also learn critical thinking, graphic design and spatial awareness in creating the games, said Lauren Hinish, a technology coach at Propel.

"If you are learning to program a game about fractions then you are learning about programming and fractions at the same time. You are also doing addition and subtraction," said David Touretzky, a research professor of computer science at CMU.

"If you make a game about the French Revolution, they will have to research and investigate it," Ms. McDonald said. "In addition, while they are working on it they will learn teamwork, logic and high-level analytical stuff along with skills like leadership and organization."

At the Propel conference, she said she worked with teachers to come up with ideas to create games for their classrooms.

"Two math teachers wanted to teach scalability in an adventure game and use something like 'Alice in Wonderland,' who eats and drinks things that make her smaller and bigger," she said. Some fourth-grade math teachers talked about using a game with centipedes and millipedes, bugs with different numbers of legs, in a multiplication game.

Ms. McDonald said she believes the use of gaming in education will increase.

"I think we are only just scratching the surface of the good that games can do in teaching things to people whether it's in school or in life," she said.

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